

(12) UK Patent Application (19) GB (11) 2 123 908 A

- (21) Application No 8220432  
(22) Date of filing 14 Jul 1982  
(43) Application published  
8 Feb 1984  
(51) INT CL<sup>3</sup>  
F16D 69/02  
(52) Domestic classification  
F2E 1A1A2 1A1B 1A1C  
1A1X1 HB  
(56) Documents cited  
GB 1115443  
GB 1053613  
GB 0823675  
(58) Field of search  
F2E  
(71) Applicants  
Automotive Products plc,  
(United Kingdom),  
Tachbrook Road,  
Leamington Spa,  
Warwickshire CV31 3ER.  
(72) Inventors  
Harold Hodgkinson  
(74) Agent and/or Address for  
Service  
R. M. Farrow,  
Automotive Products  
plc.,  
Tachbrook Road,  
Leamington Spa,  
Warwickshire CV31 3ER.

(54) Disc brake pad

(57) The pad comprises a sheet metal tray 12 having a lining 10 bonded therein and extending outwardly from the tray. The lining comprises a layer of insulating material 24 bonded to the tray base and a layer of friction material 25 bonded to the insulating layer. A metal reinforcement member 22 is embedded in the insulating layer spaced from the base 12a of the tray.

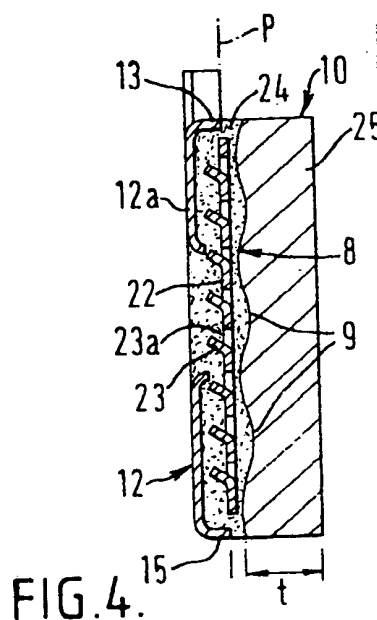
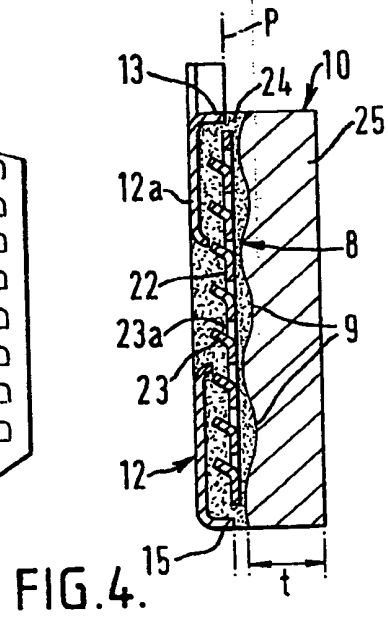
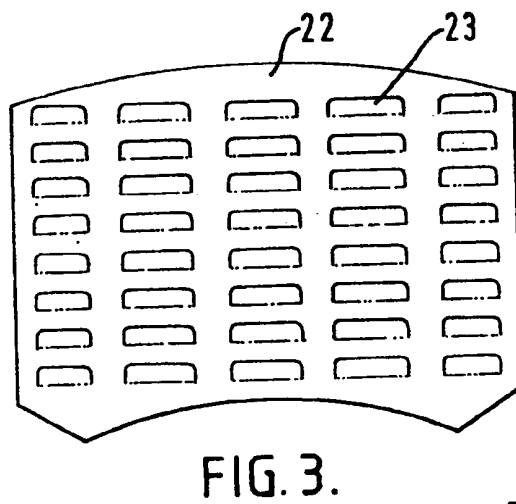
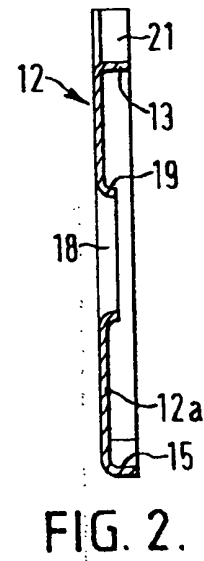
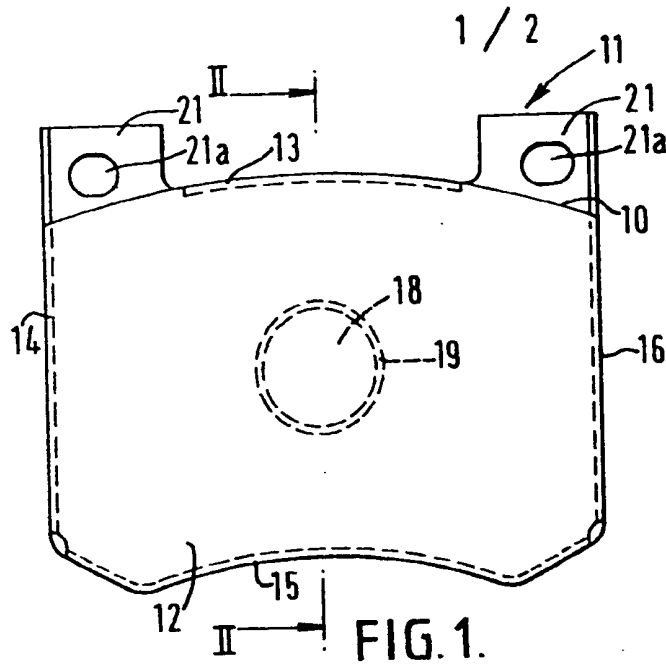


FIG. 4.

GB 2 123 908 A

2123908



2/2

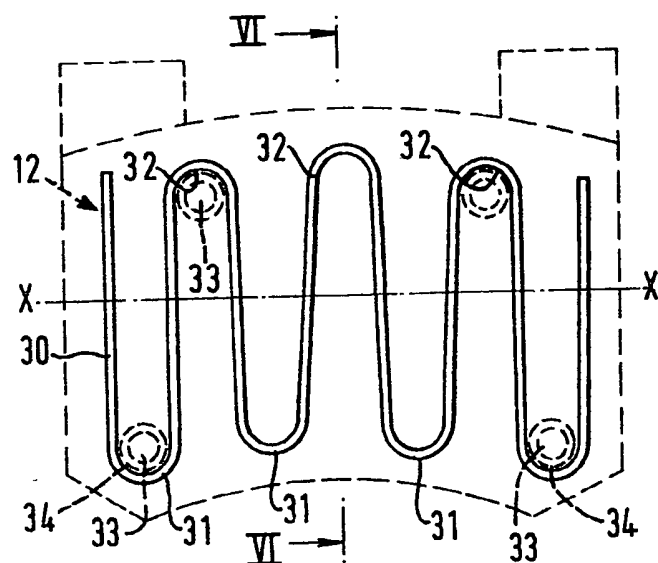


FIG. 5.

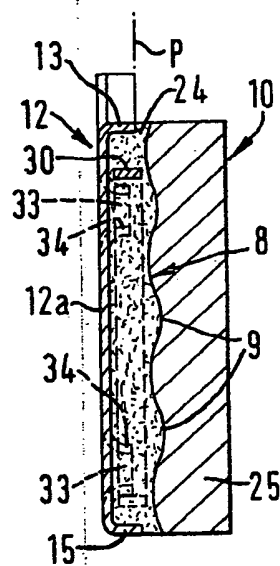


FIG. 6.

## SPECIFICATION

## Disc brake pad

5 This invention relates to disc brake pads particularly though not exclusively for use in disc brake calipers of motor vehicles.

Disc brake pads usually comprise a substantial steel backing plate onto which a friction material lining is bonded. The backing plate must be strong enough to both transmit application loads to the friction material and react drag forces to the vehicle structure.

Present day trends are to reduce weight of vehicle components without compromising strength and functioning. This can lead to lower fuel consumption, and where unsprung weight is reduced, improvements in suspension and ride control.

Brake pad backing plates are relatively heavy components which contribute to the vehicle unsprung weight where wheel mounted calipers are used.

It has been proposed in British Patents Nos. 1 185 175 - 1 185 180 to provide a pressed steel pad backing plate bonded to the friction material lining. One problem with the constructions shown is that they do not provide adequate bending strength in the vertical plane of the pad.

Present day trends are also demanding increased life of consumable vehicle components such as brake pads. In particular semi-metallic friction materials are being used to extend the life of brake pads. These materials have a higher conductivity than existing materials and can result in excess heat being transmitted to the backing plate with the attendant danger of vaporising brake fluid and damage to rubber and plastic components of the brake caliper.

Heat insulators may be fitted to the pad backing plates but these increase the width of the pad resulting in less usable friction material, increased weight and greater cost.

The present invention seeks to provide an improved brake pad which overcomes the aforementioned problems to provide a lightweight economical construction which can incorporate an insulating element.

According to the present invention there is provided a disc brake pad comprising a sheet metal tray having a friction material lining bonded therein and extending outwardly from the tray characterised thereby that a metal re-inforcement member is embedded in the lining adjacent the base of the tray.

Preferably the member lies substantially between the base of the tray and a plane defined by the upturned edge of the tray.

The bending strength of the pad is substantially increased by the extension of the re-inforcement member into the friction material whilst retaining a light and economical construction.

In one preferred embodiment the re-inforcement member comprises a plate spaced from the base of the tray and having lateral projections extending into the friction material, the plate may be level with the upturned edge of the tray and have half sheared tabs

extending towards the base of the tray only.

In this way the re-inforcement lies substantially within the boundary of the metal backing plate provided in conventional brake pads so that the nominal wearable thickness of friction material is unchanged.

In another embodiment the re-inforcement member comprises a flat metal strip placed edgewise against the base of the tray and having a serpentine form. The plate may be of wave form, the crests of troughs of the wave being respectively at the top and bottom edges of the brake pad.

In a modified pad construction a layer of insulating material is bonded between the base of the tray and the friction material lining. The insulating material must be compatible with the friction material layer and is preferably a friction material mix itself but without modifiers and additives and not subject to the rigorous quality control checks of the friction material layer.

Such an insulating layer can be of a substantial thickness without increasing the overall width of the pad or reducing the wearable thickness of friction material lining. The re-inforcement member may be embedded wholly within the insulating layer to provide the maximum thickness of insulating material without risking damage to the brake disc from the re-inforcement member at the fully worn condition.

There will be no damage likely should the insulating layer come into contact with the brake disc although the insulating layer may not give as effective braking as the friction material layer, as hereinbefore mentioned.

In this specification and claims references to a friction material lining may include linings having an insulating layer and a friction material layer.

The invention will be described by reference to two preferred embodiments shown, by way of example only, in the accompanying drawings, in which:-

*Figure 1* is a plan view of a disc brake pad according to the invention;

*Figure 2* is a vertical section through the backing tray of the pad of *Figure 1* on line 'A-A';

*Figure 3* is a plan view of a re-inforcement plate for use in the pad of *Figure 1*;

*Figure 4* is a vertical section through a pad as shown in *Figure 1* and incorporating an insulating layer and the re-inforcement plate of *Figure 3*;

*Figure 5* shows the pad of *Figure 1* in dotted outline and having a serpentine wire strip re-inforcement; and

*Figure 6* is a vertical section through the brake pad of *Figure 5* on line 'B-B' and incorporating an insulating layer and the re-inforcement strip.

The preferred embodiments show brake pads having an insulating layer and friction material layer though it will be realised that brake pads having a homogenous one-piece lining are within the scope of the invention.

With reference to *Figures 1-4* there is shown a disc brake pad 11 comprising a sheet metal backing plate 12 having upturned edge flanges 13-16 and a central aperture 18 also having an upturned edge flange 19.

The backing plate 12 has two upstanding lugs 21 each having an aperture to receive a pad retaining pin.

5 A sheet metal re-inforcing plate 22, generally of the same shape as the backing plate 12 but lying within a boundary defined by the edge flanges 13-16, has a series of oblong tabs 23 half sheared there-through.

10 The re-inforcing plate 22 is bonded within a layer of insulating material 24 moulded onto the backing plate 12 and has the tabs 23 facing towards the base of the backing plate. The plate 22 is completely embedded within the layer of insulating material.

15 The brake pad is completed by a layer of friction material 25 bonded to the layer of insulating material 24.

In the present construction the friction material 25 is preferably a semi-metallic material, such materials have a high thermal conductivity.

20 The tabs 23 serve to re-inforce the backing plate 12 against bending about the axis of symmetry without reducing the wearable thickness of friction material.

In the embodiment of Figures 5 and 6 a serpentine wire strip 31 is embedded in the layer of insulating material 32 and located by apertures 33 pressed through the backing plate 34 and having raised edge flanges 35 shown in dotted outline.

25 Other metal re-inforcements may be readily envisaged. So long as the re-inforcement is retained within the layer of insulating material or, where the brake pad has a single homogenous friction lining, substantially within the boundary imposed by the upper edge of the edge flanges, the layer of wearable friction material will be equivalent to that of a conventional brake pad.

30 In brake pads which have a greater radial width than circumferential length it may be preferable, for example, for the serpentine strip to have its crests and troughs at the sides of the pad to ensure adequate bending strength on the long pad axis.

## CLAIMS

1. A disc brake pad comprising a sheet metal tray 45 having a friction material lining bonded therein and extending outwardly from the tray characterised thereby that a metal re-inforcement member is embedded in the lining adjacent the base of the tray.

2. A brake pad according to Claim 1, characterised thereby that the re-inforcement member lies substantially between the base of the tray and a plane defined by the upturned edge of the tray.

3. A brake pad according to Claim 2, characterised thereby that the re-inforcement member comprises a plate spaced from the base of the tray and having lateral projections extending into the friction material.

4. A brake pad according to Claim 3, characterised thereby that the plate is substantially level with the upturned edge of the tray and has tabs half sheared out of the plate and extending towards the base of the tray only.

5. A brake pad according to Claim 2, characterised thereby that the re-inforcement member comprises a flat metal strip placed edgewise against the

base of the tray and having a serpentine form.

6. A brake pad according to Claim 5, characterised thereby that the metal strip is of wave form, the crests and troughs of the wave being respectively at the top and bottom edges of the brake pad.

7. A brake pad according to Claim 5 or Claim 6, characterised thereby that the strip is located in the tray by projections pressed out of the tray base towards the friction material lining.

75 8. A brake pad according to any preceding Claim, characterised thereby that a layer of insulating material is bonded between the base of the tray and the friction material layer.

9. A brake pad according to Claim 8, characterised thereby that the re-inforcement member lies wholly within the insulating layer.

10. A disc brake pad substantially as described herein with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office, by Croydon Printing Company Limited, Croydon, Surrey, 1984.  
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.